



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/526,911

07/25/2005

Richard P. Anderson

ITP 35

7550

43008

7590

07/10/2009

HARRY M. LEVY  
OLSON & HIERL, LTD.  
20 North Wacker  
36th Floor  
CHICAGO, IL 60606-4401

EXAMINER

ZALASKY, KATHERINE M

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

07/10/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/526,911	<b>Applicant(s)</b> ANDERSON ET AL.	
	<b>Examiner</b> KATHERINE ZALASKY	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20090514</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. **Claims 1-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Armstrong et al. (US 5,779,761) in view of Knoll (US 2,205,854).

Regarding **claims 1 and 19**, Armstrong et al. discloses a method of separating metal particulates from a slurry of liquid metal and metal particulates and salt particulates (abstract), comprising filtering the slurry to form a cake of metal and salt particulates with some liquid metal (C3/L64-C4/L2).

While Armstrong et al. does present methods of separating liquid metal, metal and salt particulates which first mixes titanium tetrachloride and sodium to form a solid of titanium and sodium chloride in the presence of heated argon (C3/L43-63), the reference does not explicitly disclose the steps of breaking the cake and then removing liquid metal from the broken cake, and thereafter separating the metal and salt particulates. However, the reference does acknowledge the method of Knoll which involves the steps of breaking up and crushing the solid mass, purifying the titanium and then drying the product (C1/L61-65). Armstrong uses a more controlled process to form the solid mass, though the sodium chloride still has to be separated from the titanium (C1/L46-61). Armstrong et al. also teaches that it is well known in the art to use either sodium or magnesium to reduce the titanium halide.

Knoll teaches that the solid mass may be heated in an argon atmosphere at normal pressure to evaporate any remaining alkaline metal from the solid mass, the solid is cooled and then further treated with water washing to remove the alkaline metal salt (C1/L39-46, C7/L44-47, C7/L71-C8/L3, C8/L12-29).

It would have been obvious to one having ordinary skill in the art at the time of the invention to purify the titanium from the solid mass formed in the method of Armstrong et al. by breaking up the solid mass, heating the mass in an argon

Art Unit: 1797

atmosphere at normal pressure to remove alkaline metals and then water washing the solid to remove alkaline metal salts, as taught by Knoll, since doing so is nothing more than the combination of well known prior art elements according to known methods to yield predictable results.

While Knoll does disclose that the metal particles are sized to 150 meshes/cm<sup>2</sup> (C8/L23-40), the reference does not disclose that this step occurs before the first water washing step. However, Knoll also uses magnesium instead of sodium, which does not produce an explosion upon contact with water. It would have been obvious to one having ordinary skill in the art to first size the particles and then perform the first washing step in the method of modified Armstrong, since this method uses sodium. It would be beneficial to break down any remaining sodium particulate in the solid mass since doing so would minimize the potential for a large explosion.

Regarding **claim 2**, modified Armstrong discloses all of the claim limitations as set forth above. Additionally, Knoll discloses the method wherein the liquid metal is removed from the broken cake by heating in an argon atmosphere at normal pressure, not by vacuum distillation. However, the removal of reduction reaction products by vacuum distillation is very well known in the art (as evidenced by Wilcox, US 2,835,567, C5/L16-19 and Spink, US 3,966,460, C3/L19-28). It would have been obvious to one having ordinary skill in the art to use vacuum distillation instead of heating under the argon atmosphere at normal pressure to remove the alkaline metal from the solid mass since doing so amounts to nothing more than the simple substitution of one known process for another to achieve a predictable result.

Regarding **claims 3-7 and 20-23**, modified Armstrong discloses all of the claim limitations as set forth above. Additionally, Knoll discloses the method wherein the liquid metal is removed from the broken cake with a hot swoop gas, the hot swoop gas is an inert gas, the inert gas is argon, the hot swoop gas is at positive pressure and the hot argon swoop gas is at positive pressure (C1/L39-46, C7/L44-47, C7/L71-C8/L3).

Regarding **claim 8-10 and 24**, modified Armstrong discloses all of the claim limitations as set forth above. Additionally, while Armstrong et al. does not explicitly disclose that the liquid metal is present in the filter cake up to about ten times the weight of the metal particulates, the reference does disclose that the sodium is put into contact with the titanium tetrachloride in excess (C3/L43-65). Therefore, the filter cake produced will inherently have liquid metal present in an amount greater than the weight of the metal particulates. Additionally, Armstrong et al. discloses the method wherein the liquid metal is an alkali metal or an alkaline earth metal or mixtures thereof and the liquid metal is Na or Mg (C3/L43-48).

Regarding **claims 11-12 and 25**, modified Armstrong discloses all of the claim limitations as set forth above. Additionally, Armstrong et al. discloses the method wherein the metal particulates are Ti and the metal particulates are a Ti alloy (C3/L43-67).

Regarding **claims 13-14**, modified Armstrong discloses all of the claim limitations as set forth above. Additionally, Armstrong et al. discloses the method wherein the salt particulates are a halide and the salt particulates are a chloride (C3/L43-67).

Regarding **claims 15-16**, modified Armstrong discloses all of the claim limitations as set forth above. Additionally, Armstrong et al. discloses the method wherein the metal particulates are Ti or a Ti alloy and the salt is Na or Mg chloride and the liquid metal is Na and the salt particulates are NaCl (C3/L43-67).

Regarding **claims 17-18 and 26-27**, modified Armstrong discloses all of the claim limitations as set forth above. Additionally, while neither Armstrong et al. or Knoll discloses that the cake is broken into pieces having diameters up to about five centimeters or that the cake is broken into pieces having diameters up to about two centimeters, Armstrong et al. does disclose that the solid mass is broken down and crushed prior to purification by the Knoll method (C1/L61-65). As the surface area of the solid mass is a variable that can be modified, among others, by adjusting the diameter of the broken cake pieces, the precise diameter would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed diameter cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the diameter of the broken cake pieces in the method of modified Armstrong to obtain the desired surface area from which the sodium may be released (In re Boesch, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 223).

***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KATHERINE ZALASKY whose telephone number is (571) 270-7064. The examiner can normally be reached on Monday-Thursday, 7:30am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571)272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Krishnan S Menon/  
Primary Examiner, Art Unit 1797

/KZ/  
7 July 2009